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Economic incentives and poaching of the one-horned Indian Rhinoceros in Nepal

Stakeholder perspectives in biodiversity conservation: Analysis of Local, National and Global Stakes in Rhino Conservation in Royal Chitwan National Park, Nepal

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Abstract

The one-horned Indian rhinoceros (*Rhinoceros unicornis*) is of special conservation importance, and plays a key role in Nepal's growing eco-tourism industry. Abundant in the past, this rhino population now faces a multitude of threats, the most serious of which is poaching for valuable rhino horn. The main aim of this research was to carry out a stakeholder analysis in order to determine who has a stake in the welfare of Terai's rhino population. A household survey (444 interviews) was conducted in six different villages in the buffer zone of the Royal Chitwan National Park (RCNP). Tourists' attitudes towards national parks and eco-tourism in Nepal, as well as their opinions on forest and wildlife conservation, were also examined.

Stakeholder analysis revealed that there are five major stakeholders in the RCNP buffer zone: i) landless/marginalized households, ii) farmers, iii) tourism and related sectors, iv) visitors and non-users and v) government/NGOs. Each group represents different interests with regard to park management and rhino conservation. Loss of crops and livestock presents a major management problem around the RCNP buffer zone in the view of local farmers. Non-farmer groups, like the Chepang, Bote and Majhi communities, pledged to be rhino herders if the government provided them with job opportunities. Other non-farmers claimed they wouldn't disturb rhinos (or other wild animals) if they could use forest and water resources for longer periods of time on a regulated basis. Local poachers explained that they were looking for alternative sources of income to avoid being involved in such a risky business. The park authority considered the establishment of the national park (and subsequent conservation of rhinos) to have not only contributed to the national economy, but also to community development in buffer zone areas. As nature and wildlife form the basis of the eco-tourism industry, tourism entrepreneurs believed they had also contributed positively to local conservation. Despite some negative impacts on their livelihoods, local people valued rhinos and equated them with national wealth. They believed rhinos have a right to co-exist with the surrounding human population.

The discrete choice experiment conducted confirmed that all stakeholder groups found the proposed management scenarios more attractive than the status quo. Most respondents were in favour of compensation for rhino-related damage, and supported a community development program funded by parks revenues. Interestingly, the general preference for these compensatory measures peaked at about 50%, indicating that either respondents do not require full compensation, or they do not believe higher amounts would be forthcoming. Respondents would particularly value increased tourism employment opportunities and greater possibilities to use park resources. Most importantly, if these compensatory measures were put in place, the majority of respondents would have a clear linear preference for more rhinos. The various stakeholder groups reacted as expected; the highest income farmers regarded high

compensatory measures as less important than low and mid-income farmers, while the landless marginalised group considered i) greater park access and ii) an income generation program as very important. The challenge for a pro-poor conservation policy is to integrate the needs of poor people into efforts to conserve an international public good, in this case rhinos. It is vital to ensure that poor farming and non-farming households are compensated for the costs they incur in supplying this unique good.

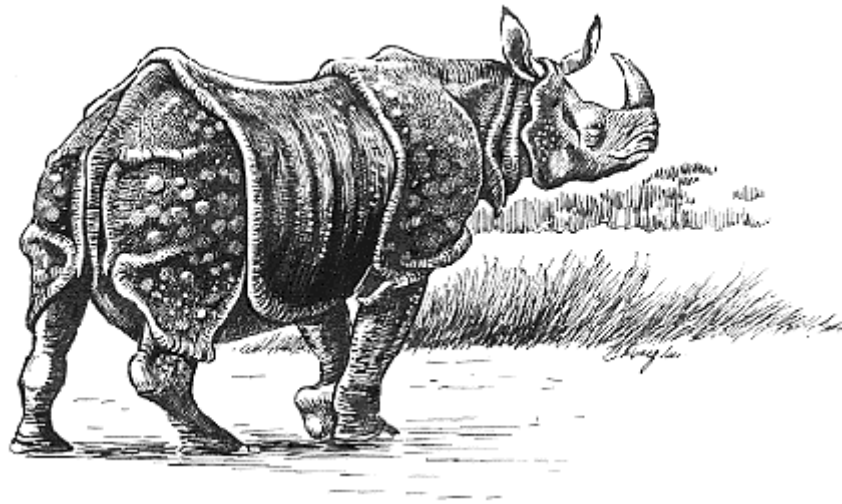
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1. Introduction

Biodiversity conservation and poverty reduction strategies remain one of the major discourses of environment and development in developing countries. Poverty is thought to lead to the degradation of the environmental resource base, and exclusion from crucial resources, as changes in property rights increase the vulnerability of poorer households. Furthermore, in many cases, communities cannot be excluded from the use of natural resources; this increases the pressure on these resources and causes their progressive deterioration (Chopara and Gulati, 1998). The nature of the environment-poverty nexus is still contested, with causality between poverty and resource degradation argued to run both ways (Perrings, 1989). However, in general, high levels of poverty are thought to be associated with increasing pressure on critical natural resources. Biodiversity loss is most severe in those areas of the world containing significant genetic resources. But these areas also contain the world's most poverty-stricken people, and for these populations environmental resources play a vital role in survival. Since conserving or preserving biodiversity is often too costly for poorer countries, sustainable management of these resources is a challenge for policy makers.

Local communities often see wildlife from a different perspective, in a way that may be dissimilar to that of conservationists. Wildlife may represent a threat and a nuisance rather than a valuable resource. Moreover, they often view land and natural resources as a gift of nature, on which they base their livelihoods. These resources not only play an important role in their survival, but also help maintain local culture and traditions. People living in national park buffer zones depend on natural assets for fuel, livestock feed, building materials, fruits and medicines. They gain access to such resources through both formal and informal mechanisms. The establishment of national park and wildlife reserves has typically excluded them from resources on which they were traditionally dependent. The establishment of protected areas has also severely impacted indigenous customary rights, values and beliefs, and livelihood support systems (Nepal, 2002). Despite considerable success in establishing conservation areas and national parks in developing countries, conflicts over the use and management of park resources are gradually increasing. This is because the costs incurred from conservation are always more than the related incentives, i.e. people are losing more from conservation than they gain by supporting it.

Each resource in the park (and surrounding ecosystem) is associated with complex and often conflicting stakeholder interests. Different stakeholders bring to their decision-making different assumptions and knowledge, conflicting claims over resources, and goals for that resource, which are not always not identical with regard to common pool biological resources (Adams *et al.*, 2002). When a conservation programme does not meet the local peoples' needs, conflict results. No policy intervention can meaningfully contribute to biodiversity conservation without a basic understanding of stakeholders involved, and their economic interest in the system. Policy-makers' and planners' failure to recognize the different and potentially conflicting interests of various stakeholders, and what each stands to lose or gain from conservation decisions, has frequently led to local resistance to conservation policies and projects. These policies and projects therefore fail to meet their intended objectives (Gimble *et al.*, 1995). Due to the interdependency that exists between the resource and people living around it, successful

management depends on the identification and understanding of different stakeholders and their stake in conservation of biodiversity. Understanding the positions and interests of stakeholders involved in conservation efforts is vital in order to resolve conflicts in biodiversity conservation.

The main purpose of this working paper is to highlight the interests of different stakeholders in rhino conservation and park management in the Royal Chitwan National Park (RCNP) in Nepal. Two stakeholder analysis approaches were used. The first approach is primarily qualitative with some quantitative and statistical elements (survey-based). Stakeholder analysis in this approach is concerned with the identification of the different stakeholder groups in and around the RCNP buffer zone and a description of their interests in rhino conservation. They are identified on the basis of their attributes, inter-relationships, and their interests in park management and rhino conservation. An attempt is made to investigate their interests, characteristics and circumstances with particular regard to rhino conservation. Finally, we suggest some options for poverty reduction and sustainable biodiversity conservation in the RCNP.

The second approach used was purely quantitative and analytical. It was concerned with the possible responses of different stakeholder groups to potential policy options. It was recognised that tradeoffs may be necessary with regard to access to the park and compensation for segments of the population that might be negatively affected by rhino activities. One approach to investigating the preferences and tradeoffs between several policy options, conservation goals, and community benefits is to use a stated preference method (such as a discrete choice experiment) in which the affected stakeholders are asked about their preferences in a formal survey. Thus, the main aim of the quantitative discrete choice analysis is to investigate the trade-off behaviour of stakeholders (using?) indicators of ecological integrity, conservation outcomes and policy options.

The working paper is organised as follows. The next section reviews the data collection, field survey and analytical methods used in the study, including the theoretical and empirical models to be analysed in the discrete choice experiment. Next, the results obtained from both qualitative and quantitative analyses are reported. Results obtained from the discrete choice experiment are presented for the overall model (for the entire sample), as well as in terms of sections that highlight the differences between key stakeholder groups. The working paper finishes with some general conclusions and policy implications.

2. Approach and Methods

2.1 Identifying Stakeholders

Stakeholder analysis is currently used in many disciplines, ranging from political science to international relations. The concept and related methodology have made significant inroads into poverty reduction studies and applied research pertaining to issues of sustainable livelihood, community-based natural resource management and conflict management (Ramirez, 1999). Freeman (1984, p. vi) defines a stakeholder as “any group or individual who can affect, or is affected by, the achievement of a corporation’s purpose”. Grimble and Wellard (1996) underline the usefulness of stakeholder analysis in understanding the objectives and problems of stakeholders. Present or potential sustainable

management of natural resources requires understanding a system by identifying the key actors or stakeholders in the system, and assessing their respective interest in that system (Grimble *et al.*, 1995).

Stakeholders may have an urgent and legitimate claim on (and power to influence the management of) the natural resource system in question. The combinations of these salient features determine the participation of specific stakeholders in conservation decisions (Njogu, 2003). Stakeholder analysis needs to be viewed in terms of the various institutions, social groups and individuals who possess a direct, significant and specific stake in park management and wildlife conservation. However, not all stakeholders are equally interested in biodiversity conservation, nor are they equally entitled to play a role in the management of local commons. Njogu (2003) has argued that the stake might originate from an institutional mandate, geographical proximity, historical association, livelihood-dependence, economic interest and a variety of other capacities and concerns.

Njogu (2003) further posits that stakeholders involved in conservation can be defined by three main attributes: a) stakeholders are aware of their interest, b) stakeholders possess specific capacities such as knowledge, skills or expertise and/or comparative advantages such as proximity or mandate, and c) stakeholders bear the cost or are willing to invest resources for local level resource management. In addition to these three attributes, Njogu further proposes some additional criteria for distinguishing stakeholders:

- Historical and cultural relations with natural resources;
- Existing rights to land or resources;
- Relationship continuity with resource in question (i.e. residents versus visitors/tourists);
- Unique knowledge of resource and resource-management skills;
- Losses and damage incurred in the biodiversity conservation process,
- Degree of effort and interest in resource management;
- Equity in terms of access to resources and distribution of benefits from their use and,
- Compatibility of i) interest and ii) social and economic activities of the stakeholder with national conservation and development policies.

2.2 Qualitative and Survey-based Methods

The research findings concerning key stakeholder groups are based upon qualitative and survey-based information, which was collected during fieldwork in the buffer zone areas of the RCNP. Qualitative research was multi-method, involving an interpretative naturalistic approach to the subject matter. This involves qualitative researchers studying things in their natural settings, attempting to make sense of or interpret phenomena in terms of the meanings people bring to them (Creswell 1998). In this study, qualitative research involved the collection of a variety of empirical data (case study, interview, personal experience, observational notes, visual texts etc). They were mostly in prose texts that recorded researcher observations and impressions, descriptions of diverse events, and recollections of informants (including their thoughts, feelings and attitudes towards rhino conservation). This information was recorded mainly in two types of field notes: scratch notes (which help document quotes of informants) and a short memo or field notes (in which researchers noted down detailed descriptions of observations and interviews). The

field notes served as a final depository of research data. In order to collect descriptive ethnographic data, participatory appraisal methods were used. The fieldwork was conducted for two weeks (5 days in December 2003 and 10 days in January 2004). The major research tools used for the fieldwork included observation, focus group discussion, key informant interviews and case studies. These research tools were used to generate purely qualitative data from different stakeholders, mainly local farmers, hotel and lodge owners, park officers and poachers in jail.

Three different strategies were used to gather information from the field discussions. As an initial step in the analysis, interview transcripts, observational field notes and case studies were read thoroughly. The words and ideas (quotes and statements) of informants were looked at closely and then translated into the subject or theme of the research project without distorting informants' own (emic) perspective. The second step involved using codes or categories. Codes were used not only to produce counts of things (in terms of frequency or percentage distribution), but to sort text into categories that facilitated the comparison of data within and between these categories. This aided in the development of theoretical concepts. The third step involved the presentation of field data in the form of matrices or tables, causal flow charts, concept maps, diagrams, figures, and several case studies. They are similar to memos in that they make ideas and analysis visible and permanent; they also facilitate the understanding of relationships between variables. Finally, research data relating to rhino poaching were interpreted in the broader economic and social context of the households. Attempts were made to identify and understand the relationships between different variables of rhino poaching. This required contextualizing the data analysis. One example of contextualizing analysis is the use of case studies and narrative analysis of poachers. This looks for relationships that connect statements and events within a context into a coherent whole and helps in the analysis of individual poacher and/or stakeholder situations.

A household questionnaire was the main survey tool used to collect quantitative information. The household survey gathers information on the socio-economic status of households, production systems, household use of park resources and households' perceptions towards rhino conservation and park management. Further details regarding the household survey are provided in the main report. Village-level qualitative and quantitative data relating to infrastructure development, area and utilisation patterns of park resources (amongst other factors) were gathered by a village-level survey.

Basing stakeholder analysis on individual interviews is a crucial factor in success. This is because results from individual discussions may often contradict those results from group discussions. Arguments or conflicts in a group discussion imply taking a different stand and distancing oneself from the community as a whole. This is often not socially acceptable. Since the specific factors shaping the existence of different stakeholder groups are likely to vary between landscapes, and may depend on the particular issue within the group, an "open-ended constructivist inquiry" was adopted. Using this approach, local people were invited to express their concerns, ideas, values and issues relating to wildlife and national park management. The assumption is that in every resource dependent community, there exist groups of individuals bonded by a common interest in a particular aspect of natural resource use and management. These individuals constitute an interest group with common stakes, constraints and opportunities in National Park management and wildlife conservation.

2.3 Discrete Choice Experiment

General Approach

The discrete choice experiment¹ (DCE) is a stated preference technique where respondents are asked to evaluate hypothetical scenarios, as opposed to the researcher modelling actual behaviour (i.e. revealed preference methods). For the purpose of implementing a DCE, two separate components are required: a) a statistical design plan to create the hypothetical scenarios, which have combinations of policy or outcome attributes, and b) a statistical method to analyse the responses (Louviere *et al.*, 2000). The most commonly used statistical method of analysis is the multinomial logit model, which is based on the behavioural assumptions of random utility theory (McFadden, 1974). This kind of choice modelling based on random utility theory originated in transportation research, and has been used extensively in the fields of applied decision making and market research (Adamowicz *et al.*, 1994). While originally the theory was used to model actual behaviour (i.e. revealed preferences), when the choice behaviour is based on the evaluation of hypothetical profiles or choice sets, one talks about stated preference research (i.e. conjoint analysis if one profile is evaluated), or stated choice research, if two or more profiles are presented in one choice set (Louviere and Woodworth, 1983, Louviere *et al.*, 2000). In each of these choice sets, the respondent is presented with two or more alternative scenarios (one of which often involves maintaining the status quo), and is required to indicate his/her preference for one of the alternatives, assuming these are the only alternatives available.

Each alternative is described in terms of a number of attributes. For each attribute, there are multiple levels that describe the attribute. In addition, these attribute levels are usually varied in each choice set according to an orthogonal statistical plan.² By aggregating the responses from all the respondents, it is possible to derive part worth utility functions for each attribute. These part worth utilities demonstrate the importance of various attribute levels to the choice selection of an individual.

To calculate efficient part worth utilities, the DCE study must be carefully designed to ensure orthogonality of attribute levels both within and between alternatives. A full factorial design, in which all main effects and interactions are orthogonal (i.e. independent), represents one extreme for a design plan that a researcher could employ for a choice experiment. However, full factorial design plans require individuals to evaluate an unrealistic number of choice sets, even in cases where the total number of attributes is small. Therefore, researchers typically compromise the ability of a design plan to estimate all interactions by selecting a design plan that requires only a reasonable number of choice sets to be evaluated. A fractional factorial design plan is one such plan that reduces the size of full factorial designs. A variety of fractional factorial design plans exist that range from orthogonal estimation of main effects without any interactions, to plans that permit

¹ The literature may refer to i) a discrete choice model, ii) a choice model, iii) a choice based conjoint or contingent choice; some of these terms lead to confusion because the distinction between stated or revealed preference or choice model becomes indistinguishable.

² In an orthogonal design, the attribute levels are uncorrelated with any other attributes, thus ensuring that the part worth utilities measure only the intended attribute and are not confounded with other attributes.

various degrees of orthogonal main effects and interaction effects to be estimated (Louviere *et al.*, 2000).

Theoretical Background

The theoretical basis for stated choice research lies in random utility theory. In this theory, a person's utility from a particular site or experience is described by the following utility function (sometimes referred to as a conditional indirect utility function):

$$U_{in} = V_{in} + \varepsilon_{in}. \quad (1)$$

The utility gained by person n from alternative i is made up of an objective or deterministic and observable component (V) and a random, unobservable component (ε) (Adamowicz *et al.*, 1994, 1998). The unobservable component, often referred to as 'a random error component', is commonly assumed to be Type I or Gumbel distributed, and to be independently and identically distributed (McFadden, 1974). A result of this assumption is that a DCE must be independent of irrelevant alternatives (IIA), meaning that "the ratio of choice probability for any two alternatives is unaffected by addition or deletion of alternatives" (Carson *et al.*, 1994, p. 354). In simpler terms, the IIA requires that alternatives are independent.

The observable component of utility (V) can be expanded as follows:

$$V_{in} = ASC_i + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k \quad (2)$$

where the ASC_i is an alternative-specific constant that represents the "mean effect of the unobserved factors in the error terms for each alternative" (Blamey, Gordon & Chapman, 1999, p. 341). Furthermore, β_1 is the coefficient for the first attribute, X_1 is the level for the first attribute, and there are a total of k attributes.

An individual will choose alternative i over alternative j if (and only if) $U_{in} > U_{jn}$. Thus, the probability that person n will choose alternative i over alternative j is given by the equation:

$$\text{Prob}(i|C) = \text{Prob}\{V_{in} + \varepsilon_{in} > V_{jn} + \varepsilon_{jn}; \forall j \in C\} \quad (3)$$

where C is the complete set of all possible sites from which the individual can choose. Since the ε term is assumed to be Gumbel-distributed, the probability of choosing alternative i can be calculated by the equation (McFadden 1974):

$$\text{Prob}(i) = \frac{\exp^{\mu v_i}}{\sum_{j \in C} \exp^{\mu v_j}} \quad (4)$$

which represents the standard form of the multinomial logit model (MNL).

Design of the Discrete Choice Experiment for the RCNP

The household survey in the RCNP, described in the previous section (also see the Main Report), was used to administer the DCE. The DCE component was developed through a series of discussions with experts, focus groups, and pre-tests in the field. The main purpose of these stages was to identify and describe the most relevant attributes and associated levels. The final attributes and attribute levels chosen for the DCE are summarised

in Table 1. They reflect the need to describe changes in the main park benefit (number of rhinos protected), which also doubles as the key ecological indicator. But they also capture gains to the community from the existence of the park and its rhinos, in terms of i) tourism employment and ii) an income generation program for the benefit of the entire community. Two attributes describe compensatory policies, such as compensation paid to farmers for crop damages by rhinos, and the access to park resources (especially thatching grasses for the local population). Each of these attributes was described on four levels, and these were derived from field-testing.

The scenarios created by combining the five variables in different attribute combinations resemble future outcomes (results) of possible management actions. Two scenarios were then combined into one choice set (Figure 1). Each choice set contained two hypothetical alternatives, A and B, and one additional scenario describing the status quo situation. Respondents were asked to choose one of these three alternatives or to state that none of the three were acceptable. All respondents were residents of communities within the buffer zone of the RCNP.

Creating scenarios from five attributes with four levels each, amounts to a 5^4 factorial design. A fractional factorial representation of a resolution III main effects design (Addelman, 1962) requires 32 replications. Given the fact that the data were collected through personal interviews, each respondent was shown only four choice sets, and the total of 32 choice sets were divided into eight survey versions. Given the low level of literacy in the buffer zone, the DCE study involved mostly illiterate or semi-literate rural residents. Therefore, the choice sets were created in the Nepali language, as well as with pictographs to convey the meaning of each attribute and its respective level (see Figure 1). All attributes were specified as numeric variables with four levels, and therefore were conducive to simple representation in a vertical sliding bar. Each choice set was printed on a separate sheet of paper and each version of the DCE (i.e., four choice sets) used for a particular respondent was printed on the same coloured paper, to avoid confusion. Finally, each book of the eight versions of choice sets (i.e., 32 choice sets in total) was bound in a small spiral binder for multiple use. This administration of a DCE is novel (see Rasid and Haider, 2003) and appeared to be a very effective method for collecting multivariate trade-off information from a rural population in a developing country.

The numeric nature of all variables allowed us to estimate each variable with a linear and, if applicable, a quadratic specification; this resulted in a more efficient model³. The statistical analysis was undertaken in LIMDEP v.7 (Greene, 1998).

3. Identification and Description of Stakeholders in Rhino Conservation

Based on the preliminary findings of the field research in the buffer zone of the RCNP, the main stakeholders are categorised into five different groups. They are a) non-farmers who are mostly landless and marginalised peoples, b) farmers, c) hotel and lodge owners connected to tourism related sectors, d) government and NGOs interested in conservation and development, and e) visitors, who are mostly foreign tourists. Table 2 presents a

³ This mode of analysis required fewer degrees of freedom and allowed us to investigate all two-way interaction effects; however, none were significant, which is an important finding in itself!

preliminary assessment of these stakeholders in terms of their current interests in the rhino population of Nepal. The next section provides a detailed analysis of individual stakeholder perspectives in a context where multiple users contest park management and resources.

3.1 Non-farmers

Typically non-farmers and landless people make up the marginalized ethnic groups such as the Chepang, Bote and Majhi communities. Non-farmer households were further divided into two different groups: i) non-farmer landless/marginal and ii) non-farmer households employed in the RCNP (undertaking various jobs). Employed non-farmers usually don't have large holdings to undertake agricultural activities, but are employed by the park. Table 3 presents the socio-economic attributes of non-farming sample households around the RCNP buffer zone. It appears that most landless/marginal households belong to lower caste groups (85.7 per cent Baisya and 14.3 per cent occupational groups). In fact, none of the sample households belonging to the landless set were from the Brahmin or Chhetri caste groups (which are higher caste groups in Hindu society). Obviously, employed households have higher levels of education than landless/marginal people. Surprisingly, most employed households were from the third caste group, which includes ethnic groups such as Tharu, Gurung, and Magar (see Annex A for detailed case studies of the communities and villages where this study was undertaken). As expected, education of respondents was higher for employed households than for landless and unemployed households. Fishing, wage labour and other off-farm activities were the most important occupations for landless households. Employed households relied more on small businesses and governmental/non- governmental services. Livestock holding was almost double for employed people than for landless and marginal employed households.

With the exception of Tharus, historically Chepang, Bote and Majhi do not own lands in their own names. They lived on marginal lands and still depend upon the forests and rivers for their subsistence. The communities most affected by the park are the indigenous peoples of Pithauli, Dibyapuri, Patihani and Padampur Village Development Committee (VDCs) around the RCNP buffer zone. These communities have been living in the forests and riversides of the national parks for generations, and depend on the forest, land and water resources for their livelihoods. Before the establishment of the national park, the Chepangs used to collect wild fruits, vegetables, mushrooms and other forest products to eat, and a variety of medicinal plants to cure illness and diseases from the forests. After the establishment of the national park, these communities lost traditional rights over their lands, forests, rivers and other natural resources. At present, many Chepangs are in custody at Kasara and Bharatpur jails for their illegal collection of wild vegetables and other forest products from the national park.

Like the Chepang, the Bote and Majhi groups have also lost their traditional rights to fish in local rivers. Botes and Majhis are sailors. They are mainly fishermen and traditionally were dependent on fishing as a source of protein and income. Besides catching fish, they also sail boats in different junctions/passes of the Rapti River for other communities, in order to supplement their family income. But with the establishment of the national park, they lost their rights over rivers and were forced to settle on the banks of the Rapti River. Due to the new policy of the national park, they are denied their traditional livelihoods. At present only a few Bote households of Dibyapuri own land. Other Botes in Patihani

(along with Majhis of Pithauli) do not own any agricultural lands. The government has issued fishing licenses to a limited number of Bote and Majhi peoples. Other Botes and Majhis are not eligible to get fishing licenses as they do not have Nepali citizenship certificates (and those who do not own any lands are not eligible for citizenship certificates). Moreover, these poor Botes and Majhis do not have any other livelihood alternatives, as there are no job opportunities available to them. As a result, there is increasing impoverishment among these communities.

The loss of traditional rights over the river has also resulted in the loss of Botes and Majhis' patron-client relationships with other communities. Since the establishment of the park and the construction of roads and bridges over the river, the Bote and Majhi do not sail boats for their clients. The loss of traditional rights has also caused the loss of traditional knowledge, skills and technology. At present, traditional knowledge is limited to a few older people. The younger generations of the Bote and Majhi communities do not know how to make boats out of Simal (*Bombex ceiba*) or Sissau (*Dalbergis spp.*) trees; how to sail boats in the river; how to weave fishing nets and prepare fishing hooks; or how to catch a variety of fish from the river. Many young Chepang people are not familiar with the medicinal values of forest trees, as they have no access to local forests. Loss of traditional knowledge has also resulted in the loss of community identity. After the confiscation of their traditional rights over lands, forest and water resources, they came into close contact with other communities to work as agricultural labourers or other forms of wage labourers. They made contact with other non-indigenous communities and learned their ways of life; consequently, they have forgotten their languages, culture and religion. This has endangered their ethnic identity.

The loss of traditional rights over their land, water and other natural resources has threatened the loss of cultural practices and sacred sites of indigenous peoples. As mentioned earlier, Bote and Majhi people used to move from river to river. While Bote and Majhi men caught fish and sailed their boats, their women used to collect green vegetables (*jaluka*) from the banks of rivers, collect fuel woods, grind grains, make food and feed their men and children. They used to organize marriages on the islands of the river, give birth, celebrate festivals, sing traditional songs, dance and perform rituals there. They worshiped their ancestral deities and buried their dead. At present, the park authorities do not allow the Bote and Majhi communities to practice their cultural rituals on traditional lands, because their traditional lands now fall within protected areas. The park has restricted their physical movement. Naturally, they have lost their cultural practices and sacred sites.

Since there is a lack of job opportunities, some people belonging to this group are involved in the poaching of rhino. Interviews with poachers revealed that economic incentives from rhino poaching were one of the main reasons behind poaching (see Annex B for the detailed interviews with poachers). However, some poachers who are in jail said that they were innocent. They were arrested by the forest guards and park security guards without any evidence and allegedly put into jail for no reason. Some of them were arrested because their enemies in the villages reported them to the police and park officers as poachers. They were beaten, tortured and made to confess to the crime. They know that the government has not only spoilt their lives but they have also spoilt their family's lives. During the interviews, it was revealed that about 70 people were arrested for their involvement in rhino poaching. Almost all of them come from very poor families of in-

indigenous communities. They are now in the jail for several years. They do not know why they are there or how long they will be there for. They do not know about legal processes and they have not used any legal aid. They are demanding quick action by the government on their cases so that they can get a chance to work for their families.

Tharus are the largest group of indigenous people in the study area (Sharma, 1991). Traditionally, they are agricultural communities with farming lands and large herds of cattle. They own and control a large area of agricultural land inside the national park of Chitwan. But the establishment of the national park has affected them negatively. Although they have incurred some losses (such as physical threats and crop damage from the rhinos), Tharus of Bagmara and Bachhauli villages are very supportive of rhino conservation in the national park. Tharu communities around the park near Sauraha have also benefited economically and culturally from the park and rhino conservation. They have been employed as office assistants, tour guides, elephant herders, mahutes or elephant drivers, and hotel staff. Many Tharu peoples independently run small-scale hotels, lodges and pubs in Sauraha. They have established a Tharu cultural club, which organizes traditional Tharu cultural programs each night for tourists and other visitors. Many foreign tourists and other researchers come to watch their cultural programs mostly in groups. Their cultural programs are a source of income for their communities. Through the cultural club, Tharus have raised awareness about their culture among national and international communities and they have presented their communities to the outside world. At present, Tharu communities are committed to protecting their traditional culture.

Table 4 presents the current park resource use pattern among households. Local people used to collect thatch grass, reed (kans and khadai), babiyo and smittis, fodder and firewood. It appears that non-farming employed households rely more on the park for thatch, reed and babiyo than landless households. Since landless and marginal households do not have other alternative sources of income, they collect slightly higher quantities of other products (which include firewood, fruits and nuts etc.) than non-farming (but employed) households.

The establishment of the park has affected the socio-economic life of some indigenous people. For example, traditionally, water is the source of the socio-economic and ritual life of the Majhi people. Now they cannot use rivers for fishing and boating. They demand that the government should either give them land for cultivation or a job to support their family. If provided with land or a job, they can then take care of rhinos and other wild animals. Majhis are accused of poisoning the river and killing fish and crocodiles. But Majhis have said that they never use poisonous substances to catch fish. Botes are another indigenous ethnic group whose traditional occupation was to process gold from sands in the Rivers, catch fish and operate boats in different places (Ghat) on the rivers. They were mobile people until recent decades. But these days they have a sedentary life and agriculture is their main occupation. Both the construction of bridges over the rivers, and the fishing restrictions introduced by the national park have forced them to change their traditional occupation. However, Botes are a little better off than the Majhi community. Many of their houses are thatched with straw, which they collect from the national park and community forests. Very few rich Botes have houses with galvanized corrugated iron sheets. Bote people say that they have really tamed wildlife (particularly rhinos) for the government. They know that rhinos are government's property and if they

touch government property, they will be punished heavily. So they do not even drive rhino out of their farmlands. If the government gets rich from rhinos, they hope that one day they will also become rich.

3.2 Local farmers

Local farmers around the park buffer zone were further divided into three different stakeholder groups (i.e. poor, middle wealth and richer households), based on criteria that villagers think important for assessing an individual's socio-economic position in the village. The main criteria used were the amount of land owned, the number of live-stock owned, loans given and taken, and income from off-farm agricultural activities (Fox, 1983). Land quality and household food sufficiency were also taken into account in order to categorize the socio-economic position of the household and to assign individual households to identified ranks (Richards *et al.*, 1999; Adhikari, 2003a, 2003b). Table 5 shows the socio-economic characteristics of sample households belonging to the three income groups. Households belonging to the poor income group are from lower caste groups (about 53 per cent fall under the Baisya group which includes Tharu, Gurung, Magar, Bote, Maji and Newar) whereas higher income groups represent upper caste households. In terms of education, households belonging to higher income groups are better off than their poorer counterparts. Almost all respondents from sample households fall into the age group 40-50, with richer respondents being slightly older than respondents belonging to poor and middle-income groups. The average household size is about 5 people for the poor group, 6 for the middle group and 7 for the rich income group. A few respondents in the study sites reported that some of their household members were away from home as seasonal or temporary migrants.

Livestock are an integral part of farming systems in the study sites, as is the case for other parts of the country. In general, households were more likely to have cattle than any other farm animal, followed by buffalo, goats and sheep. Male cattle were essential to the maintenance of agricultural systems as they provided animal traction for cultivation and were often used to assist in the threshing of grain. Buffalo was the second most popular animal because it provided milk and manure. For many households, goats and sheep were a source of cash income as they can be sold in the local market for meat. Goats and sheep, being small animals, consume less fodder and unlike cattle, there is no religious restriction on their slaughter. Very few sample households raised pigs. Differences in livestock ownership were clearly evident between income groups: the average size of livestock holdings were 1.13 for poor, 2.85 for middle and 4.3 for richer households.

Farmers with large and medium-sized farms near park areas and buffer zones reported that rhinos have caused a lot of damage. Analysis of crop damage by rhinos revealed that rich and middle-income farmers lost about 3913 and 2727 Nepalese rupees (Nrs.) every year. Furthermore, they have to spend about Nrs. 1000 constructing and maintaining defensive measures in their fields. Of course, they get some benefits. These include fodder, firewood, thatching grass from the park, buzzer zone area and community forests for their personal use and some money for community development. However, these benefits are not enough to compensate their losses. Rhinos damage the crops of farmers. The damage caused by the rhinos is particularly evident in Sauraha, Bagmara, Ratnanagar, Pithauli, Dibyapuri and Patihani VDCs. In these VDCs, rhinos damage paddy, wheat,

maize and lentil plants, eat their cauliflowers, potatoes, radishes, banana trees and other vegetables. Many local farmers in these VDCs have abandoned the cultivation of wheat as rhinos like to graze in wheat fields during winter. Many people reported that often rhinos destroy their fences and houses and eat their crops and foods. But they do not get any compensation, because the government does not have a policy to compensate crop damage and other physical destruction.

Table 6 presents the use of park resources by farmers for each income group. Though not significant, poorer households in the study site collect more resources from the park than richer households. However, households belonging to the middle-income groups rely more on reed and other products from the park than their poorer counterparts. Some people in the lower income group continue to rely heavily on thatching materials from the park.

Small farmers do not own big plots of agricultural land. They produce limited amounts of food grains from small plots of land. But their production is decreasing each year due to the national park, mainly for two reasons. Firstly, their crops are damaged by rhinos, and they are given no compensation. Like rich and middle-income farmers, they also suffer from crop damage by rhinos, which is worth about 2200 Nepalese rupees every year. Furthermore, they also incur costs through the construction and maintenance of defensive measures in their fields, which is about Nrs. 1000. Secondly, the national park has affected numbers of livestock. Due to the establishment of the national park, households do not have access to fodder grasses, particularly in Piple VDC. They also cannot graze their animals in community forests. As a result, people own only a limited number of livestock of selected types. The limited number of livestock cannot provide sufficient manure for the agricultural fields. So wealthy families use chemical fertilizer and poor families cultivate lands without any manure. In both cases, the quality of soil has worsened each year, which in turn has reduced agricultural production. As a result, many self-sufficient households have become dependent on food from the market. There is low local-level support for conservation largely because only a few people gain directly from tourism in the park.

Other groups of small and medium-income farmers were evicted from their homeland in the Padampur VDC inside the RCNP. They were resettled without their consent in New Padampur called Sagun Tole. They received only one-third compensation for their lost lands. With their forceful eviction, the physical and spiritual relationship with their territory was broken. They now find it very difficult to adapt to a new, alien environment. Mclean and Straede (2003) reported that the relocation process has had devastating impacts on the livelihoods of relocated people in New Padampur VDC. Their livelihood strategies shifted from subsistence agriculture and extractive activities to labour wages in the nearby markets. Since the productive capacity of the land to which they have been relocated is very poor, these people have to rely on a very unreliable wage labour market. Since the New Padampur is also characterized as a water scarce area, women have to spend considerable amounts of their time collecting water. Most relocated households reported experiencing detrimental effects on their livelihood in terms of social structures, cultural heritage, jobs, labour relations, and general future prospects (Mclean and Straede, 2003).

Most households belonging to these income groups think that their life is always at risk. They live in fear of possible rhino attacks. There are several cases of rhino attacks on local people. But the current level of compensation in case of injury is very small. In case of death from a rhino attack, a lump sum of RS. 25,000 is paid. But it is not easy for the family of the victim to get compensation from the government. A rhino killed a 45-year-old man in Dibyapuri VDC of the Nawal Parasi district on 10th of January 2004, just after the fieldwork period of this study. But his family has not yet been paid any compensation. The government's inattention to compensation annoys local people. In general, farmers are not happy to have changes imposed upon them with regard to park management and rhino conservation.

3.3 Tourism and related sectors (owners/employees)

The hotel and lodge owners, as well as business people of Sauraha and surrounding areas of the RCNP mostly positively benefit from the park (information about the interviews carried out with hotel and lodge owners is presented in Annex C). They considered rhinos to be the only source of their income. Tourists want to have easy access to rhinos. They do not want to miss rhinos when they visit the park. Every year, the RCNP attracts a number of tourists from around the world and tourists bring material wealth. Without rhinos, no tourists would visit the RCNP as there are not many other attractions. Without tourists, the hotel and lodge business is practically impossible. Until now rhinos have been in abundance. They are seen in the park, buffer zone areas, community forests and agricultural farmlands. The development of tourist facilities around the RCNP buffer zone has been rapid in response to the increasing number of visitors. As nature and wildlife are the only 'products' associated with ecotourism, tourism entrepreneurs have also contributed positively to conservation.

3.4 Government and Conservation NGOs

The protection of Nepal's natural heritage is managed by the Department of National Park and Wildlife Conservation (DNPWC) along with other conservation-related government departments. Non-governmental organizations (NGOs) play an equally important role in supporting communities, conservation initiatives and local development. Information about the interviews carried out with government and NGO officials is provided in Annex C.

The department has been implementing a series of administrative and conservation measures to manage the national park in general, and protect rhinos in particular. For example, the Chief Warden is in charge of park administration and management. In order to facilitate its management, the park is divided into four sectors, each headed by an assistant warden. There are 95 government staff working under the park authority. In addition to these civil servant staff, a battalion of the Royal Nepal Army (RNA) is responsible for the overall protection of the park in coordination with the Chief Warden. Presently, there are 331 RNA personnel at the Park headquarters, and 307 more in 32 of the 37 posts within the Park. The Chief Warden has both administrative and quasi-judicial power to prosecute park offences. By law, no one has the right over the resources of the park. However, the park authority issues permits to adjacent households to collect grass, thatch and fuelwood from the park seven days out of a year. It is estimated that about 12,000 metric tons of grass (worth about half a million dollars) was collected by about

60,000 people in 1998/99. Similarly, timber and fuelwood are provided free of charge for community development and to the people living near the park. There is a high density of people living around the park. Therefore, people also illegally enter the park to collect forest products, both for household consumption and for sale. For example, 1,239 people were caught for illegally collecting grass and fuelwood from the park in 1998/99.

As per the Buffer Zone (BZ) regulations, a Buffer Zone Management Committee (BZMC) (as an apex body of the community living in the BZ) has been formed in the RCNP. It consists of 42 members comprising 37 elected chairpersons of BZ Users' Committees (one from each of the VDCs and Municipalities), four representatives from four District Development Committees, and the Chief Warden of the Park as the member secretary. The BZMC is responsible for allocating funds for, and making decisions on, various activities in the BZ. The Users' Committee chairpersons elect the chairperson of the BZMC. The UC forms one or more user groups (UGs) in each of the settlements under its jurisdiction. The total number of UGs in the RCNP is 1,468. Out of these 722 are male, 687 are female, and the remaining 59 are mixed. The UGs can also form Functional Organizations (FOs) to undertake specific activities, such as the construction of irrigation channels. Fifty-four of these FOs have been formed in the BZ of the RCNP. The BZMC, UCs and UGs are self-governing bodies, which are independent from government organization.

The revised National Parks and Wildlife Conservation Act has provision for disbursing 30 to 50 per cent of the income of a Park to the corresponding BZMC. Based on this legal provision, the RCNP has provided about NRs 183.8 million (US\$ 2.2 million) to its BZMC over the last six years. However, it has so far spent only Nrs 77.4 million (US one million dollars). The BZMC allocates funds among the UCs based on the impact of the NP on people and their livelihoods (livestock and crop damage). In addition to the income from the BZMC, UCs also generate income from community forests under their jurisdiction and income from other sources. So far, 16 community forests covering 1,971 hectares have been handed over to user groups, and 45 such forests are in the process of being handed over. The UCs distribute compensation to concerned households for damage caused by wildlife, and also undertake community development activities in their area. They also run saving and credit facilities for the benefit of their group members. The objective of forming these UGs and UCs was so that the local people could initiate participatory activities, in order to slowly reduce dependence on the RCNP through community resource generation and livelihood promotion. Caution is required to ensure that higher income individuals do not benefit disproportionately.

The Buffer Zone Support Unit (BZSU) under the Chief Warden was supported by the UNDP through the Park and People Program (1995 – 2001) and, since 2002, by the Participatory Conservation Program (PCP). The objective of PCP is to support biodiversity conservation of Protected Areas (including the RCNP) through people's participation, and to link activities to poverty reduction in the BZ. The program aims to support government policy (conservation and livelihood promotion); community mobilization and capacity enhancement (UGs, UCs and BZMC), institutionalizing funding mechanisms, biodiversity conservation, conservation awareness and gender mainstreaming. In order that the fund at the disposal of UCs is utilized properly, the PCP is helping UCs to establish cooperatives such as saving and credit units.

The King Mahendra Trust for Nature Conservation (KMPNC) is a national level Non-Government Organization (NGO). The Trust has established a Biodiversity Conservation Center (BCC) in the RCNP. Its objective is to carry out biological research and training on biodiversity conservation. It is implementing a Tiger Rhino Conservation Project in the BZ of the RCNP and the surrounding area of national forest (under the Department of Forestry). The Global Environmental Facility is financing this project. There are many locally based NGOs involved in conservation and development in the RCNP and Buffer Zone. These NGOs work closely with the Park authority, BZMC and KMTNC. The lower level political bodies such as VDCs and DDCs are also indirectly involved in the conservation and management of the park and its BZ. Local people have also formed many user groups and community-based organizations that work for local development and provide small-scale loans to individual families if they want to start businesses to raise their family income. There are also income-generating programs, such as mushroom farming, knitting and weaving, a biogas plant project (all supported by KMTNC) and these income-generating programs are targeted particularly to park-affected communities.

Government officials think that rhinos are also important for the national economy. Tourists pay visa fees to the nation and entrance fees to the national park. The park and its rhinos enhance the natural beauty of the country. They have aesthetic value and are part of the wealth of the nation. So they should be well protected in the national parks of Nepal.

3.5 Visitors and non-users

Preservation of biodiversity in the RCNP provides an opportunity for tourists and visitors to observe a great diversity of landscapes, plants and endangered wild animals. Environmentally concerned visitors prefer 'ecotourism' and enjoy natural wilderness. As tourism promotion is one of the key strategies in the RCNP, visitors are important stakeholders who want easy access to rhinos and other wild animals. At present, over seventy per cent of the 96,000 tourists who visit the RCNP, do so mainly to see rhino and Bengal tigers. The number of tourists visiting the RCNP has increased from 836 in 1974 to over 64,000 in 1994/95 (KMTNC, 1996).

In order to understand the perceptions of tourists towards park management and rhino conservation, a survey was conducted among RCNP visitors. Perceptions towards the rhinoceros in the Chitwan National Park are the central focus of the survey. The survey took place during the period November 2003 until March 2004. About 452 tourists were interviewed at various locations: 48 per cent of the respondents were male and 52 per cent female. Table 7 shows the nationalities of the respondents, indicating that the RCNP is mainly an attraction for Europeans (56 per cent). Other important groups are Australian and Japanese tourists.

The first issue of interest is the likelihood that visitors will encounter rhinoceros during their visits to the park. The respondents were asked about their experiences during first (and possible second) trips to the park. On average, 24 per cent of the respondents did not encounter a rhino during their field trip. To test the importance of rhino in a more direct manner, the respondents were asked whether they would have visited the RCNP if they knew it was unlikely to see any rhinoceros during their stay. 12 per cent of the re-

spondents did not answer the question. Only 9 per cent of the respondents indicated that they would not have visited the RCNP at all. The remaining 80 per cent of the respondents would still have visited the national park, regardless of the presence of rhinos. Clearly, rhinoceros are not the sole reason to come to the RCNP. The majority of respondents who gave a positive response felt that humans were responsible for the decline of the rhino population and therefore humans should also provide the means to solve the problem. Most visitors also felt that nature has as much right to exist as humans.

Non-use values emphasize the uniqueness of the biodiversity resource and the irreversibility of loss or injury (Freeman, 1993). Furthermore, the importance of non-use values in i) preserving the natural state of wilderness and ii) preventing global or local extinctions of species and the destruction of unique ecological communities is often put forward by economists. Krutilla (1967) has argued that individuals do not have to be active resource-consumers (whose willingness to pay can be captured by a price-discriminating monopoly owner) in order to derive value from unique and irreplaceable biodiversity resources. Non-users of parks and their resources value biodiversity for its role in maintaining life support systems, through carbon storage, nutrient recycling and regulation of atmospheric gas. Non-users are also concerned about the components of biodiversity that we do not use today, but may be needed in the future. Non-users are interested in conserving rhinos and other resources in the RCNP for two different reasons: one related to preserving options and the second related to bequeathing natural resources to one's heirs. In general, non-users are concerned with the well being of future generations or the opportunities open to people living in the future. Though non-users currently derive no benefits from biodiversity conservation in the RCNP, they are interested in existence values of biodiversity (often referred to as 'intrinsic' values). For example, they are individuals who do not use the direct or indirect value of the RCNP but nevertheless wish to see the rhinos and other plant and animal species preserved in the park in their own right.

3.6 Discussion of the stakeholder analysis

Stakeholder perspectives are a prerequisite for the conservation of biological resources since each group has their own interest in biodiversity conservation. Although each stakeholder group can be expected to behave rationally with regard to the use and management of natural resources, they have different interests; these differences may be fundamental (Grimble *et al.*, 1995). Biodiversity consists of lands, forests, water, wildlife and other non-timber forest products. These are directly or indirectly utilized by people with different interests, stakes and socio-economic statuses. Conservation of wildlife and other biodiversity resources in protected areas will not be possible unless there are alternative mechanisms to address the needs of different stakeholders who have direct stake in conservation and development. Economic incentives associated with protected areas should be reasonably equitable for all stakeholders belonging to affected communities. If this does not happen, mistrust and conflicts between different stakeholders is likely to emerge, as some stakeholders feel that they are not gaining as much as their counterparts. Unless incentive structures are enough to compensate those losses such as crop damage, attacks on humans and their cattle, and income forgone from alternative uses of the land, there will be strong community resistance towards conservation. Community interests will clash frequently with conservation goals. An understanding of the objectives and interests of various stakeholders involved in national park management and

rhino conservation can i) improve the prediction of outcomes, ii) reduce the risk of unforeseen resistance, and iii) generally facilitate informed policy making (Grimble *et al.*, 1995).

Stakeholder analysis in the buffer zone of the RCNP revealed that there are five major stakeholders who represent different interests with regard to park management and rhino conservation. It is the local people living around the national park and conservation areas who bear the direct costs of conservation. Loss of agricultural crops and livestock present a major management problem around buffer zone areas of the RCNP in the view of local farmers. Both rich and poor farmers around the buffer zone areas lose a considerable amount of money from crop damage. Rhino and other animals damage crops mostly by eating and trampling paddy, maize, wheat, mustard and pulses and a variety of vegetables (which are grown abundantly in the villages). In addition to crop damage, loss of human lives due to rhino attack is also a matter of concern to local people. During the group discussion, local farmers mentioned that they wouldn't even drive the rhinos off their wheat farms if the government paid them proper compensation or provided guaranteed livelihood options. Non-farmers like the Chepang, Bote and Majhi promised to be rhino herders if the government provided them with job opportunities. Other non-farmers expressed that they wouldn't cause any disturbance to rhinos or other wild animals if they could use forest and water products for longer periods of time on a regulated basis. During the interviews, poachers expressed that they did not want to kill rhinos because society looks down on them. They are looking for alternative sources of income so that they do not need to be involved in such a risky business to meet their livelihood needs.

The government represents national and even global interests to conserve rhinos in the RCNP. While the national interest is composed of a combination of economic and social concerns, the global interest is in the conservation of unique genetic resources in the park and in maintaining ecosystem resilience. According to park officials, rhinos are important for the national economy. Tourists pay visa fees to the nation and entrance fees to the national park. The park authority considers that the establishment of the national park and the conservation of rhinos in the RCNP has not only contributed to the national economy, but also to community development in the park areas. Of the total income generated by the park, 50 per cent goes to community development. The official records of the national park show that, to date, 11 million rupees have been spent on local people. Thirty per cent of the funds were used for community development and 20 per cent of the funds for conservation programs. Under community development, the funds are used to build roads, school buildings, bridges, irrigation canals, wells and electricity infrastructure. Under conservation programs, funds are used for fencing community forests, skills development training, conservation awareness programs and conservation tours etc.

The park authority further claims that the establishment of buffer zones and community forests has benefited local people in very positive way. They get fodder, fuel wood, thatching materials and other essential items for their households.

Nonetheless, the equitable sharing of benefits is always a question associated with national park management and rhino conservation in the RCNP. The national park gets millions of dollars in terms of revenues from visitors and 50 per cent of the revenue goes to the buffer zone in the name of community development. But the community develop-

ment programs do not reach the poor and marginalized communities at individual household levels. The national park does not have a clear policy to compensate farmers for crop damage by rhinos. As a result, farmers are forced to drive rhinos off their farmlands using traditional methods, and have incurred substantial costs creating defence mechanisms such as trenches, watchtowers, fences and so on. Farmers demand fences and embankment of Rapti River to protect their crops from rhinos. Other non-farmers demand jobs to support their livelihoods, in return for them staying away from the park and buffer zone areas. At present, the national park core management policy is not able to accommodate the needs and aspirations of each stakeholder group. Some local communities who were living inside the park were evicted from their traditional lands and are not happy in their new settled area. Villagers think that the buffer zone benefit sharing mechanism is also unfair and inequitable. Local people, particularly poor and indigenous communities, do not have access to decision-making for benefit sharing. They also do not have other survival options. Since the establishment of the national parks, large amounts of money have been poured into protecting and conserving the biodiversity of the national park; yet the pressure of human populations on the park has not been reduced. Local people enter the forests of the national park and collect fodder and fuel wood, and this has also contributed to the loss of ecological balance in the national park.

Despite some negative impacts on local livelihoods, local people do value rhinos and equate them with national wealth. It appears that no one is in favour of killing rhinos. All types of stakeholders (including local poachers) are supportive of proper management of the national park and the conservation of rhinos. All types of stakeholders are proud of Chitwan's world famous rhinos. Tourists and other visitors want to see as many rhinos as they can in a short period of time. The tourists would not hesitate to pay even higher entrance fees if the rhinos are well protected. Hotel and business people demand peace to attract tourists and visitors to Nepal. For the hotel and lodge owners, rhinos are the only attraction for their customers. The government expects increasing amounts of revenue each year to support their staff and to run community development programs in the buffer zone areas. Since more than 70 per cent of people around the RCNP buffer zone directly dependent on natural resources for their livelihoods, it is important that economic development and poverty alleviation measures are linked to sustainable natural resource management and biodiversity conservation.

4. Discrete Choice Experiment: results and discussion

4.1 Results

In the discrete choice experiment, the scenarios were composed of discrete attribute levels; however, all levels were measured in numeric units and therefore the parameters can be estimated as linear and quadratic terms. Table 8 presents the MNL parameter coefficients, their standard errors, and *t*-values for each attribute for the entire sample. Table 9 contains the same results for separate segments of the population, differentiated by their economic status. For ease of interpretation, the results for the overall model, as well as for the four segments, are displayed as graphs in Figure 2. The y-axis in the figures represents the change in the level of policy support by the respective segment associated with a change as indicated for the respective attribute plotted along the x-axis. The remaining variables are all set to the current level; therefore at the current level, the policy

support for any one of these graphs is exactly 50 per cent, and the changes associated with the variable under consideration reflect a sensitivity analysis. The intercepts for Options 1 and 2, as well as for Status Quo, were combined for this modelling exercise for ease of interpretation. However, the hypothetical options were significantly preferred over the status quo, and all options preferred over none at all (not shown here). This pattern of preferences for the intercepts is surprisingly stable across all segments. The following sections describe the results by attribute.

Rhinoceros population

Respondents preferred a steady increase in the number of rhinos, from 200 all the way to 800 animals. The quadratic term was not significant, and it is the only attribute in the model for which the quadratic term was not significant for any of the segments. However, the marginal changes associated with the number of rhinos (as expressed in the slope of the curve) is much steeper for the landless marginalised segment, and the high-income farmers, while it is the flattest for low-income farmers (differences are significant at the 0.05 level).

Compensation for crop damages

Compensation for crop damage is not provided in the RCNP buffer zone at present. As one would expect, respondents – especially the farmer households – would prefer increasing amounts of compensation. The level of support rose sharply for initial rises in compensation; however, as the compensation rate approached 60 per cent, changes in the level of support were not so clear. Indeed, all the farming households were rather indifferent to any further rises in the compensation rate. Respondents in the various segments reacted rather differently to the varying amounts of compensation, with the high-income farmers being much less sensitive to increasing amounts of compensation at a lower compensation level as opposed to mid-income and low-income farmers. On the other hand, non-farmer households (especially the landless marginalised segment) supported crop compensation only at the lower level. As the level of compensation rose above 40, their support for the compensation policy started to decrease again.

Tourism employment opportunities

All groups (except the landless marginalized) clearly preferred more tourism related jobs. For all groups the linear estimates were significant, but none of the quadratic estimates were. This is due to the fact that the education level of landless/marginalized people is very low, and they feel that they would not have a chance to acquire these jobs despite greater employment opportunities in the village. Furthermore, obtaining a job either in the RCNP or related sectors depends on the individual's networking capacity, connections with the authorities and power relations with other individuals within the community. Although an analysis of the existing power structure is beyond the scope of this chapter, it can be said that internal village dynamics are the main determinant in explaining individuals' capacity to get jobs and other leadership opportunities. This is precisely what the landless/marginalized people do not have at the moment.

Access to resources in the RCNP

Access to the park is an important variable for many groups, because it allows them to satisfy certain subsistence needs. All groups desire some access to the park's resources,

but will be satisfied with six or seven days. Only the landless marginalized group has a strong preference for additional days of access, i.e. the maximum number of days offered in this model.

Income-generating activities

Finally, the income generation program for the community is also considered very important by all groups, as the significant linear parameters document. The high-income farmers clearly show a linear preference pattern, while the middle-income group is content with smaller loan amounts; this is reflected in a significant negative quadratic estimate. The landless marginalized strongly support this program, with an indication of demand for this program levelling off at about NR 2,000. However, the associated quadratic estimate was not significant, due to a high standard error. This observation simply implies that respondents representing the landless marginal group must have had rather diverse opinions about the importance of higher loan amounts.

4.2 Discussion of the DCE Results

The results of the DCE provide a novel way of looking at preferences of rural residents in developing countries. This is because it is a multivariate method, which requires respondents to consider the implications of several relevant attributes simultaneously. Consequently, respondents are less likely to consider strategic responses, which they might consider during preference elicitation in Likert scales. The results need to be interpreted accordingly. For that reason it is also surprising that no interaction effects between attributes emerged as significant.

The significant and linear preference for a higher number of rhinos is consistent with the anecdotal and qualitative evidence that emerged from the stakeholder analysis. Nonetheless, it is somewhat surprising, since policy discussions and earlier research indicate that many stakeholders consider the rhinos a nuisance. In all likelihood, it is not the rhinos *per se* that residents of the park buffer zone oppose, but only the nuisance they cause. If these inconveniences can be managed (as we allow for in our four additional attributes) then it appears that most stakeholders are quite happy to accept a larger rhino population. The simulation modelling based on the results of the DCE in a separate working paper makes these trade-offs very apparent.

Among the various stakeholders, the landless marginalized group behaves in a particularly varied manner with regard to several variables. Typically they demand higher levels of compensation or community programs; at the same time, they do not seem to believe in the potential of tourism related job opportunities. As explained earlier, households belonging to this group are generally from lower caste groups. Caste is an important factor in gaining access to various social services such as education, employment and so on. Scheduled castes and indigenous people have little access to resources or to influential posts in Nepal (Hussein and Montagu, 2000). The reluctance of this group to accept policy options (such as tourism related employment) is a reflection of their low level of education and socio-economic position. However, they believe that their access to a community development program through micro-credit for income generation will lift their socio-economic status. This, in turn, increases their support for rhino conservation efforts.

Segmentations according to several other socio-demographic variables were also tested. Respondents living closer to tourism centres preferred more rhinos, considered tourism related job opportunities more important, and were also more in favour of income generation plans. As to be expected, respondents who currently devote three or more days to subsistence activities in the park were in favour of additional days of access; those who currently do not use the park were much less in favour. On the other hand, the group, which currently does not make use of access, is more in favour of income generation programs.

Female respondents were significantly less in favour of the management options compared to males. They were also less supportive of higher numbers of rhinos, and had a greater preference for income generation programs. This may be due to the fact that female members of a household have more interaction with the park and the rhinos (given their higher engagement in collection and gathering activities). For example, women play a significant role in agricultural crop production and the conservation of crops. Quite often they are the first victims of crop damage by rhinos. Since women are also responsible for collecting environmental goods (fetching water, collecting grass and fodder, gathering firewood, etc.), they have quite frequent encounters with rhinos; they therefore view rhinos as a threat. This may trigger their reluctance to accept either of these management options.

5. Conclusions

Analysis of perceptions of stakeholders in this paper re-emphasizes that any conservation decisions in the RCNP that do not i) recognize the potential of each local stakeholder to conserve rhinos and other biodiversity resources and ii) address their livelihood concerns would not bring meaningful conservation and socio-economic development. Given the heterogeneity among stakeholder groups with respect to park management and rhino conservation, it is necessary to use insights from stakeholder analysis to identify synergies and minimize conflicts between them. Park-people conflicts have taken place in many areas of the developing world since national parks were first established. As such, it is necessary to find out about the incentives that have been provided to communities, the degree of community involvement, and the impact of developmental projects. It is important to ascertain whether they are meeting people's needs and what impact they may be having on biodiversity conservation. Conservation policy interventions should not only consider the impact of the intervention in an 'ex-ante' sense, but also for on-going and ex-post applications which establish trade-off criteria and monitor stakeholder incentives and assess the impact of national park management and wildlife conservation. Improving the capacity of key stakeholders in biodiversity conservation, and incorporating their interests, may not only help in reducing poverty around the RCNP buffer zone; it would also help garner support from all stakeholders in biodiversity conservation. The stakeholder analysis undertaken in this paper emphasized the need to address multiple objectives and consider stakeholder situations that can integrate all stakeholders into park management for rhino conservation.

The discrete choice experiment provided valuable insights about the preferences of the households in the RCNP buffer zone. These households constitute some of the main stakeholder groups with regard to rhinos. Key findings are that all stakeholder groups

find alternative policy/management scenarios more attractive than the status quo. For example, most respondents are in favour of compensation for crop damages, as well as community development programs funded by parks revenues. Interestingly, the general support for these compensatory measures peaks at about 60 per cent; the change in support for an increase in compensation rate beyond 60 per cent is not significant. Respondents also considered i) an increase in the number of jobs in tourism and park related sectors and ii) increased opportunities to use park resources as important. Most importantly, the majority of respondents have a clear linear preference for more rhinos. The various stakeholder groups behaved as to be expected; the highest income farmers regard the compensatory measures as less important, while the landless marginalised group considers more opportunities for park access (as well as the income generation program) as very important.

The results also suggest that people do not see increasing numbers of rhinos in the park as a threat to their livelihoods. In fact, they were happy with a higher number of rhinos, as long as other issues (such as crop compensation, employment and micro-credit for income generation) are properly addressed. Local people in the buffer zone are aware of the ecological-economic aspects of rhino conservation. Their linear preference towards rhinos may be a reflection of the fact that rhinos are an integral part of the RCNP and they have rights to co-exist with the surrounding human population. Landless/marginalized people behave slightly differently compared to the socio-economically privileged group; their preference was more towards small credit for income generation. Preference for rhinos was strongly related to the location of the village, as people living near tourist centres preferred more rhinos. Those who are currently utilizing park resources during the park open days want prolonged access to the park; this is the opposite to those who do not have access to the park to collect various products. Discrete choice analysis also shows gender differences in choosing policy alternatives. Female respondents were less keen on the proposed management options. They might consider rhinos a nuisance, as they have frequent interaction with rhinos while collecting forest products, fetching water and working in their fields.

From a methodological perspective, this study provides further evidence that a formal statistical multivariate research method can be designed and implemented successfully as a component of a much larger stakeholder survey in rural areas of developing countries. Actual comments and observations during the data collection phase indicated that this kind of a response task was perceived as an interesting game by the participants.

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Table 1 *Attributes and Attribute Levels used for the Discrete Choice Experiment (DCE).*

Attribute	Level description
Number of Rhinos in the park	200
	400
	600
	800
Compensation for crop damages (in per cent of actual damages)	0 per cent
	25 per cent
	50 per cent
	75 per cent
Tourism employment in the community (number of jobs)	500
	1,000
	1,500
	2,500
Access to parks resources (number of days allowed access)	0
	3
	7
	10
Income generation program (in NR)	0
	1,000
	2,000
	3,000

Table 2 Assessment of stakeholders in the conservation of rhino in the RCNP.

Stakeholders	Gains	Losses
Non-farmers (land-less/marginalized mainly from ethnic groups)	some access to park resources for indigenous community (i.e. fishing etc.) private profits from poaching contingent on control measures	Loss of traditional rights such as fishing, collection of fuel wood and other NTFP products from the park risk of capture and conviction for those involved in rhino poaching
Local farmers (poor, middle and richer farmers)	share in general revenues collected from park visitors and paid to local communities Collection of thatch, reeds, babiyo and other non-timber forest products from the park	crop damage or labour required for patrolling; alternative (less palatable, lower valued) crop selections; fallowing Extra labour monetary expenses incurred to construct defence mechanisms to reduce crop damage reduction in thatching grass supplies as rhino population grows and eats same grasses when still green (tentative)
Tourism business owners & employees	higher visitation rates by tourists if rhino population grows larger private income from hotel, lodge and restaurants	potential losses if many rhino lost to poaching
Government/NGO and IN-GOs	- rural development, tourism & local industry development; revenues capacity building, brokering cooperation among the main stakeholders in programme implementation	management & administrative challenges to combat poachers
Non-residents, visitors and non-users	viewing of rhinos, measured as a willingness-to-pay (WTP) for additional sightings as population grows existence value for rhinos, expressed as WTP for rhino conservation	reduced WTP if rhino population declines and fewer sightings made incur losses in welfare if population declines

Table 3 Socio-economic characteristics of non-farmer respondents at the study site.

S.N.	Attributes of respondents	Landless/Marginal	Employed
1	Number of sample households	28	22
2	Age	34.32	35.59
3	Education (# of school years)	1.71	4.23
4	Gender (per cent)		
	Male	57.1	68.2
	Female	42.9	31.8
5	Household size (# of individuals in a family)	5.11	5.32
6	Caste ⁴ (per cent)		
		-	18.2
	Brahmin	-	31.8
	Chhetri	85.7	45.5
	Baisya	14.3	4.5
	Sudra (untouchable)		
7	Occupation		
	Major	Wage labour	Business
	Minor	Fishing	Services
7	Land holding	-	-
8	Livestock units owned	.65	1.23

Table 4 Use of Park Resources by Non-Farmer Respondents, by Employment Status.

S.N.	Products	Respondents (per cent)	
		Non-farmer employed	Non-farmer landless/marginal
1	Thatch	9.67	7.78
2	Reed	5.6	3.6
3	Babiyo	3.0	-
4	Others	9.33	13.76

⁴ Traditionally *Brahmin* is higher caste and *Sudra* is lower caste and is considered to be untouchable.

Table 5 Socio-Economic Characteristics of Farmer Respondents, by Income Group.

Attributes of respondents	Income Groups		
	Poor	Middle	Rich
Number of sample households	167	144	92
Age	41.0	40.6	47.0
Education (# of school years)	4.2	4.4	4.6
Gender (per cent)			
Male	68.3	60.4	96.7
Female	31.7	39.6	3.3
Household size (# of individuals in a family)	5.3	6.2	7.4
Caste ⁵ (per cent)			
Brahmin	24.6	40.3	40.2
Chhetri	11.4	20.1	27.2
Baisya	52.7	37.5	28.3
Sudra (untouchable)	11.4	2.1	4.3
Major occupation (per cent)	Agriculture	Agriculture	Agriculture
Subsidiary occupation	Wage labour	Service	Government
Land holding (ropani)	8.4	15.0	34.2
Livestock unit owned	1.1	2.9	4.3

Table 6 Use of Park Resources by Farmer Respondents, by Income Group.

S.N.	Products	Average quantity of Products (Bharis)		
		Poor	Middle	Rich
1	Thatch	7.22	5.89	6.77
2	Reed	4.22	5	5.24
3	Babiyo	2.5	1	-
4	Other products	17.62	20.82	15.6

⁵ Traditionally *Brahmin* is higher caste and *Sudra* is lower caste and is considered to be untouchable.

Table 7 Non-resident (Tourism) Survey Respondent's Country of Origin.

Rank	Country	Share (per cent)
1	United Kingdom	20.4
2	Netherlands/Belgium	13.9
3	Australia/New Zealand	9.5
4	Germany	6.4
5	Japan/South Korea	6.2
6	Scandinavia	6.0
7	United States	5.5
8	France	4.9
9	Other Europe	4.4
10	Austria/Switzerland	4.2
11	China/Taiwan	3.8
12	Canada	3.5
13	Other country	3.3
14	India/SAARC	3.1
15	Italy	2.7
16	Israel	0.9
17	Nepal	0.7
18	Spain/Portugal	0.7

Table 8 Results for the Discrete Choice Experiment (DCE) Main Model, All Respondents.

Attributes		Coefficient	SE	T-Value
Constant	None	0.000		
	Alternatives	3.028	0.172	17.6
Rhino Population	Linear	0.489	0.040	12.2
	Quadratic	-0.053	0.040	-1.3
Compensation	Linear	0.457	0.036	12.6
	Quadratic	-0.280	0.038	-7.3
Tourism Jobs	Linear	0.358	0.037	9.6
	Quadratic	-0.038	0.039	-1.0
Days of Access	Linear	0.147	0.010	14.4
	Quadratic	-0.024	0.004	-6.0
Income Generation	Linear	0.414	0.027	15.1
	Quadratic	-0.089	0.040	-2.2
Model Statistics (N=444)		Rho ² = 0.43784 Rho ² adj. =0.36509 Log Likelihood (0):-1384.067 Parameter model: -2462.0588		

(sign. t-values in bold)

Table 9 Results from the Discrete Choice Experiment (DCE), by Economic Segments.

Attributes		High-income Farmers (N=83)			Middle-income Farmers (N=144)		
		<i>Coefficient</i>	<i>SE</i>	<i>T-Value</i>	<i>Coefficient</i>	<i>SE</i>	<i>T-Value</i>
Intercept	None	0.00			0.00		
	Alternatives	2.82	0.36	7.8	3.44	0.36	9.6
Rhino Population	Linear	0.79	0.11	7.0	0.51	0.07	7.4
	Quadratic	0.02	0.10	0.2	-0.10	0.07	-1.5
Compensation	Linear	0.53	0.09	5.9	0.56	0.06	8.7
	Quadratic	-0.14	0.10	-1.4	-0.27	0.06	-4.2
Tourism Jobs	Linear	0.46	0.09	5.0	0.18	0.06	2.8
	Quadratic	-0.07	0.10	-0.7	-0.03	0.07	-0.4
Days of Access	Linear	0.15	0.03	5.7	0.12	0.02	7.4
	Quadratic	-0.02	0.01	-1.5	-0.03	0.01	-3.7
Income Generation	Linear	0.42	0.07	5.9	0.38	0.05	8.0
	Quadratic	-0.01	0.10	-0.1	-0.14	0.07	-2.1
Model Statistics		Rho ² = 0.45531			Rho ² = 0.41946		
		Rho ² adj. = 0.38482			Rho ² adj. = 0.34433		
		Log Likelihood (0): -250.6917			Log Likelihood (0): -463.5626		
		Parameter model: -460.2497			Parameter model: -798.5056		

Attributes		Low-income Farmers (N=167)			Landless/Marginalized (N=28)		
		<i>Coefficient</i>	<i>SE</i>	<i>T-Value</i>	<i>Coefficient</i>	<i>SE</i>	<i>T-Value</i>
Intercept	None	0.00			0.00		
	Alternatives	3.15	0.29	10.7	2.55	0.60	4.2
Rhino Population	Linear	0.35	0.06	5.4	0.96	0.25	3.9
	Quadratic	-0.01	0.07	-0.2	-0.05	0.23	-0.2
Compensation	Linear	0.43	0.06	7.2	0.23	0.19	1.2
	Quadratic	-0.37	0.06	-5.8	-0.45	0.22	-2.1
Tourism Jobs	Linear	0.46	0.06	7.2	0.26	0.20	1.3
	Quadratic	-0.02	0.06	-0.3	-0.13	0.22	-0.6
Days of Access	Linear	0.16	0.02	9.2	0.28	0.06	4.4
	Quadratic	-0.03	0.01	-4.6	0.00	0.02	-0.2
Income Generation	Linear	0.40	0.04	9.1	0.82	0.17	4.9
	Quadratic	-0.08	0.07	-1.2	-0.15	0.22	-0.7
Model Statistics		Rho ² = 0.45697			Rho ² = 0.62125		
		Rho ² adj. = 0.38670			Rho ² adj. = 0.57224		
		Log Likelihood (0): -502.8676			Log Likelihood (0): -58.80591		
		Parameter model: -926.0446			Parameter model: -155.2650		

(sign. t-values in bold)






CARD - 1	विकल्प १	विकल्प २	अहिलेको अवस्था	
<p>राष्ट्रिय निकुञ्जमा भएका गैंडाको संख्या</p>  <p>Number of Rhino in the Chitwan Valley</p>	<p>८०० गैंडा</p> <p>800 Rhino</p>	<p>४०० गैंडा</p> <p>400 Rhino</p>	<p>६०० गैंडा</p> <p>600 Rhino</p>	
<p>बालीनाली नोक्सान बापत क्षतिपूर्ति</p>  <p>Compensation Rate for Crop Damages by Rhino</p>	<p>५० %</p> <p>0.5</p>	<p>५० %</p> <p>0.5</p>	<p>० %</p> <p>0</p>	
<p>खरखडाई संकलनको लागि निकुञ्ज खुल्ला रहने अवधि</p>  <p>Length of Period to access Park Resources</p>	<p>वर्षमा ३ दिन</p> <p>3 days/year</p>	<p>वर्षमा १० दिन</p> <p>10 days/year</p>	<p>वर्षमा ३ दिन</p> <p>3 days / year</p>	
<p>मध्यवर्ती क्षेत्रका बासिन्दाका लागि पर्यटन व्यवसायमा रोजगारीको अवसर</p>  <p>Tourism Employment available to Locals</p>	<p>५०० रोजगारी</p> <p>500 jobs</p>	<p>१५०० रोजगारी</p> <p>1500 jobs</p>	<p>१००० रोजगारी</p> <p>1000 jobs</p>	
<p>आयमूलक कार्यको लागि आर्थिक सहयोग</p>  <p>Income Generation Program</p>	<p>रु १०००</p> <p>NR 1000</p>	<p>रु ३०००</p> <p>NR 3000</p>	<p>रु ०</p> <p>0 NR</p>	
	<input type="checkbox"/> विकल्प १	<input type="checkbox"/> विकल्प २	<input type="checkbox"/> अहिलेको अवस्था	<input type="checkbox"/> कुनैपनि विकल्प ठीक लागेन

Figure 1. Example of a Choice Set used in the Discrete Choice Experiment (DCE).

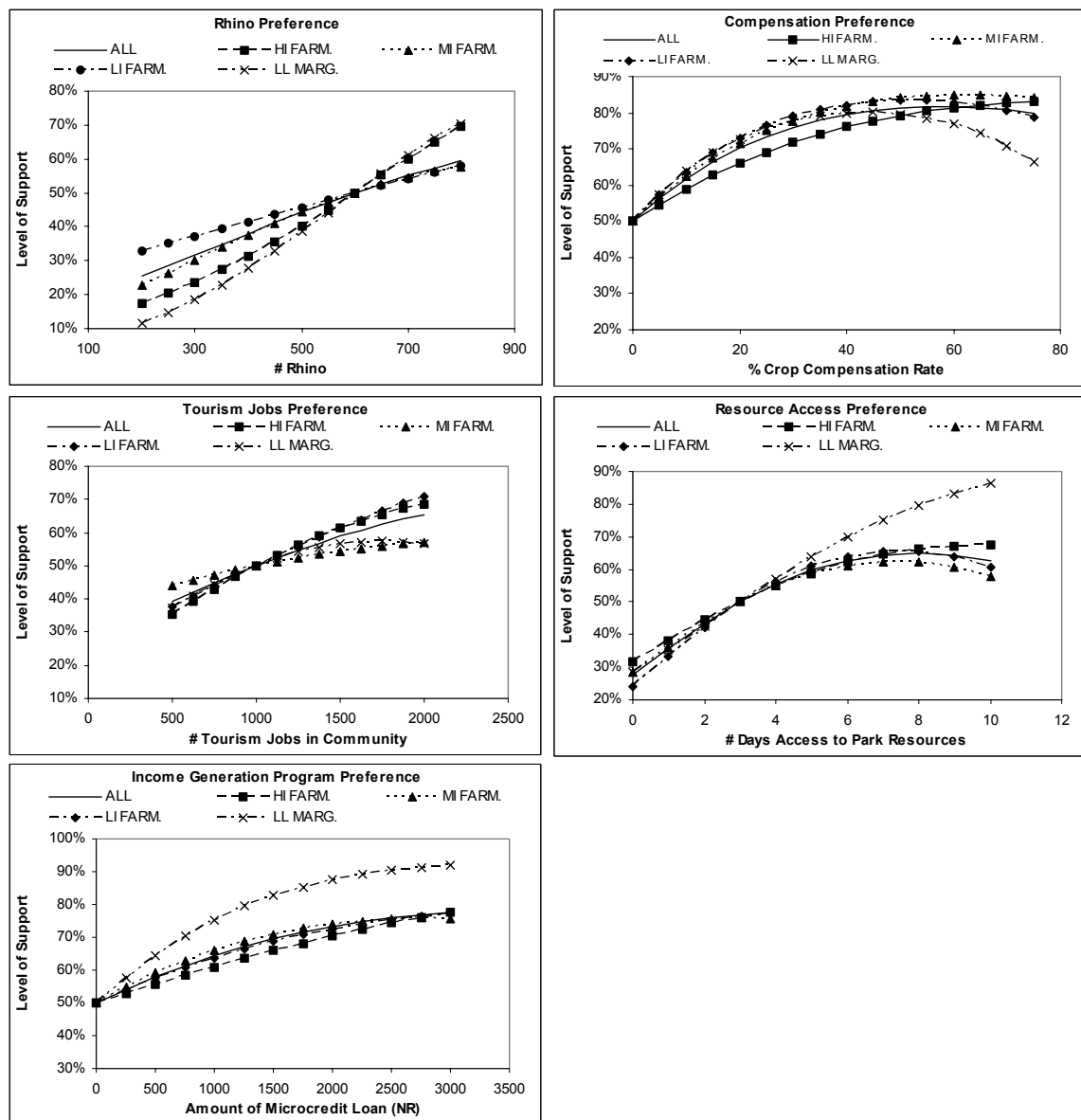


Figure 2. *Sensitivity Analysis of DCE Results for each Attribute, by Economic Segments.*

ANNEX A Group discussions with villagers in the vicinity of Royal Chitwan National Park (RCNP)

Group Discussion 1

Pithauli VDC - 8, Majhi tole, Nawalparasi

In this village, there are 30 Majhi and 15 Bote households. Economically, Botes are little bit better off than Majhi. Bote own little lands but Majhi do not own any lands. They live at the bank of Rapti River erecting small huts in the waste lands. Bote live in a little bit better quality of lands. Both Bote and Majhi are same community, but they have been identified as two different indigenous communities of Nepal with no specific reasons. The main profession of Majhi until the introduction of Chitwan National Park was boating and fishing in Rapti River. Now they no longer follow their traditional occupation. Only after 1998/99, the park has provided them with fishing license. But all Majhi have not received the license, as they do not have land ownership certificates and without land ownership certificates, they cannot get fishing license. Those who have license can catch fish from Bhadra to Chaitra (August to March/April). After April, Bote and Majhi are not allowed to catch fish, because fish lays eggs.

According to Majhi people, the establishment of Park has affected their socio-economic life. Traditionally, water is the source of their socio-economic and ritual life. Now they cannot go to river for fishing and boating. Yet they have not negative attitude toward the park. They are not very much affected by the rhinos. Because they do not have agricultural lands, they do not loose crops. Sometimes, they put their life at risks. Yet they are supportive to the park. In fact, they have been watching rhinos for the military. On last November, they found a dead rhino in their area and they immediately reported to the park. The park people assured them a prize of RS. 10,000, but they have not received the prize yet. They say the government always lies to them. During emergency period 19 Majhis were arrested, but they were released later. Majhi peoples say, they love park, because it is the government property, but the government does not love them back. They take care of rhinos, because the guards posts come to their home and ask them to do so. While they catch fishes for the military peoples, military people do not say anything to Majhi, whereas they get arrested when they catch fish for themselves. Army people also give order to Majhi to collect fire woods from the park and buffer zone for the use of military and they threaten Majhi if they fail to obey the military order.

Majhi community love park. They however demand that either the government should give them land for cultivation or job to support their family. If provided with lands or job, they can take care of rhinos and other wild animals. Ultimately the government is not coming to watch rhinos.

Majhi community complained that they ask for lands or job, the government says that the river is free for them, when we go to the river, the military men point gun at them. Majhis are accused for poisoning the river and killing fishes and crocodiles. But Majhis said that they never use poisonous stuff to catch fishes. They use fishing net, hooks and trap. Majhis found a number of dead rhinos in the park and buffer zone and reported to the government. Last year, one Majhi man found the horn and bones of a dead rhino when he was collecting fodder. He was rewarded with Rs. 2500. That is the only incentive so

far the Majhi community have received from the government for their honesty. Last November another Majhi found a dead rhino and reported to the park people. The park authority assured him for a prize of Rs. 10,000, but he has not received yet. When Majhis go to report the guard post, the military people threaten blaming them for killing rhinos. Majhis said why should they kill rhino? What would they do with the dead rhino?. They said that they have heard that buffer zone has been established in 1998, but they have not received any benefits from it. They collect fire woods and thatching straw from the buffer zone and that is all. Buzzer zone committee promised to make a tube well for Majhis so that they can irrigate whatever land they have and do fish farming, but it did never work.

Group Discussion 2

Pithauli VDC- 8 Laugai, Nawalparasi

This VDC has community forest and it is a by-product of the rhino conservation program of the national park. The number of rhino has increased significantly after the establishment of community forest in 2052. After the establishment of community forest and buffer zone, the villagers also have received funds for community development. Last year this ward received 153,000 from the buffer zone committee and money was used for the construction of roads, bridges, and school building. The poor families benefit from the community development programs by sending their children to the school. They collect thatch straw from the community forestry. One family collects 550 bundles of straw and they sell at the rate of 3 rupees a bundle that generates 1650 income in total or one family a year. The committee opens the forest in December for 7 days. Besides thatching straw, villagers collect fire woods in December and January. They collect fire woods without using chopping tools. They also collect fodder from the community forest for two months in April and May. From the park, they collect straw (*khar/khadai*) and fire woods for three days. But it costs extra money to pay to the boatman for transport.

However, people in this area always suffer from rhino phobia. Particularly, women are victims of the phobia as they go to collect fuel woods and fodder from the community forest and fetch water from the tube wells and buy things from the weekly markets. Men have fear when they go to work in the field and forest. Last year one man was attacked by rhino and he got injured when he was collecting thatching straw. People in this village cannot walk after dark. They completely need to stop walking after 8 o'clock. People who live below the high way never live in peace during summer (rainy season) as rhino finds easy way to enter into their village from that direction. The rhino route from other direction remains closed during summer due to swelling Rapti River.

Almost all people in the discussion reported that they are not against the park and rhino conservation. But they need compensation for crop damage. People are very poor. They depend upon agriculture, but their crops are damaged by rhinos and so far they have not received any compensation for their crop damage. Peoples are unemployed and the tourism has not benefited them to solve their unemployment problem. If peoples get compensation of their crop damage or get employment opportunities, they will more seriously pay attention to take care of rhinos.

Group Discussion 3

Pithauli VDC- 8 Laugai, Nawalparasi

Rhinos are good animals. They are national symbol of Nepal and national property of our country. So their protection is not a question. But the damage done by them should be compensated properly. This was a saying of local people.

In the experience of the village people, Pithauli is the most rhino affected area. Rhinos make more damage in this area from August to March/April. Rhino threatens the live of village people. People do not get sleep at night as they always have fear of rhino attack.

Villagers in this area gave up the cultivation of winter crop of wheat, because it is always damaged by the rhino. Other vegetables damaged by rhinos are radish, Cauliflower and potatoes. According to the village peoples, the government thinks wild animals are more valuable than human population. So they give more importance to protect wild animals ignoring the life of human population. For example, if rhino kills a man, the compensation is RS. 25,000. But if someone kills one rhino, many peoples are put into jai at a time.

Only young people are involved in poaching rhinos and they come from the local area. Involvement of the local people is very important for poaching rhinos. Without the involvement of local people, it is almost impossible to poach rhinos by an outsider poacher. Then why local young people get involved in rhino poaching? Because they are unemployed and they need money. There are no industries and other working opportunities for the young peoples. The government promised to create employment opportunities for local people by establishing buffer-zone in their areas. But they have not seen where the employment opportunities lie.

Suggestions for rhino conservation:

- Appropriate compensation should be paid to the local farmers for crops damaged by rhinos;
- There should be guaranteed employment opportunities;
- Government should help local people for good fencing of their village;
- They need help for embankment of Rapti River;
- There is no light in their village, so they need electricity to lights during night;
- After the establishment of community forest, rhinos live there;
- Government should put wild animals of the community forests to the national park.

Group Discussion 4

Dibyapuri VDC – 2, Keurani village Bote Tole

Botes are another indigenous ethnic group of Nepal. There are 25 Bote households in Keurani village of Dibyapuri VDC -2. Their traditional occupation was to process gold from sands in the Rivers, catch fishes and operate boats in different place (*ghat*) of the rivers. They were mobile people until recent decades. But these days they have a sedentary life and adopted agriculture as their main occupation. The construction of bridges over the rivers and restriction put on fishing by the national park forced them to change their traditional occupation. These days, they catch fishes during especial occasions and when there is flood in the rivers nearby their homes using fish net, fish trap and fishing

hooks. They say that there are not much fishes as They were before due to use of poisonous stuff by other people. These days, some Bote men engage themselves in making furniture while other go to thatch roofs of neighbours and relatives and make some money to supplement their family economy.

Botes are little bit better off than their own Majhi community. All of them in this village own little pieces of agricultural lands of better quality ranging from one and a half kaththa to 2 bighas and produce foods at least for three to six months. Their homes are nice, bigger and spacious. Many of their houses are thatched with straw, which they collect from national park and community forests. Very few rich Botes have thatched their houses with galvanized corrugated iron sheets.

Bote people say that they have really tamed wild life, particularly rhinos for the government. They know that rhinos are government's property and if they touch the government property, they will be punished heavily. So they do not even drive rhino out of their farmlands. If the government gets rich out of rhinos, they hope that one day they will also become rich.

While asking about the benefits from the park and community forests, the Bote peoples replied that they get fodder and fuel woods, thatching straw, drinking water taps etc. They have been assured for boring water and generators for irrigation, but they have not yet received it. If they get it, they can grow vegetables and they do not need to buy vegetables from the market.

The loss from the rhinos is great. They have abandoned cultivating wheat. Rhinos eat and destroy maize, cauliflowers, potatoes, radishes, paddy plants and banana tress. They affect small farmers more than any other communities. The government talks about 25 per cent of the crop damage, but local people do not know that any body has really got the compensation.

The local people have also physical threat from rhinos. They attack people anytime. They attack both men and women when they go to forest to collect fodder, and fuel woods and thatching straw. They are attacked by rhinos when they go to rivers to catch fishes, collect wild vegetables, and fetch water. They have also possible attack by rhinos when they go to weekly markets and get back homes late evening. In any case, women are threatened most than men by rhinos, because they cannot easily and quickly run away or climb the tree for protection. But in actual case, men have been attacked more than women. Last year, one man was killed by the rhino in the community forest when he was collecting grass from the community forestry. The villagers do not know how compensation the victim's family got from the government.

There is no guard post nearby their village, so there are many incidents of rhino killings in their region. Two years ago, poacher killed a rhino in the buffer zone. The villagers reported it to the guard post office, but they do not know what action was taken to the poacher. The young people of this village have formed their own voluntary youth organization to protect rhinos from poachers and village people from the possible attack of rhinos.

Botes are never involved in rhino poaching. They fear with the social punishment. Once they get involved in such a business, the society always looks at them differently.

Group Discussion 5

Piple VDC- 4, Dubichaur

Dubichaur is the Paraja (Chepang) settlement. There are 20 households of Praja and a few households of Tamang, Biswokarma (BK) and Pariyar. Their huts stand in the waste public lands where they have very small amount of agricultural lands for maize, paddy and vegetable cultivation. So they are almost landless peoples. They live in small huts made of wooden poles and thatched with straw. Women go to the forest across the East-West high way to collect fuel woods and other forest products. They also go to community forest to collect fuel woods and thatching straw. Men go to work in other peoples' fields as daily wage labourers. With the exception of a very few children who go to nearby public schools for primary education, most of the children stay at home looking after their youngsters.

Praja people of this village know about the park and buffer zone, but they do not know how come it can benefit them economically. They have also heard about the community organization in their village, but none of them has become a member of community organization. They said that in order to be a member of the community organization, they need to attend a weekly meeting and pay Rs. 5 each time of the meeting membership fees. And it is difficult for them to attend weekly meeting and pay weekly fees as they need to go to work. They also know that they can take loan from the Buffer zone committee to start small scale enterprises. But none of them has borrowed money from the buffer zone committee for two main reasons. First, they do not know the process very well. Second they think it insulting because the buffer zone committee confiscates whatever properties they have if they become unable to return the loan in time.

Praja people told that they were taking care of one rhino named Junge until he was moved to Kasara Park. Junge was an orphan male rhino. He was found alone in the forest when its mother was shot to death by the poacher several years ago. So he was left free to move from door to door. People fed him when he was very young. Later, he destroyed farmers' crops at farms and other grains at homes. Yet people did not cause any harm to him. Later he was moved to Kasara forest for his better care by the park people. After his move, they have no damage by other rhinos, as they do not come to their areas. With regard to the benefits from the park and rhinos, Praja people said that benefit goes to those households, which have lands and livestock. For the poor, no effect of rhino increase or loss. But it is good to have many rhinos.

Group Discussion 6

Piple VDC – 4, Dubichaur

In the group discussion, many people expressed their opinion in favour of the park and rhino conservation. According to them, an increase in the number of rhino is beneficial to the nation. There are benefits for the villagers as well. There are development programs, such as gravel roads and irrigation canal in the village after the establishment of buffer zone. Although the individual household has not benefited directly from the park and buffer zone, the community has benefited from it. Of course people also get fodder, fuel woods and thatching grass from park and community forests. But the park is opened only for three days, which is not enough to collect thatching grasses and fuel woods for the households. Government should open the park at least for 10 days, because unlike in

other community forests, there is no thatching straw in the community forest and buffer zone of Piple VDC.

Of course the crop damage is not that serious in this village. But people cannot collect fuel woods from the park and community forests and sands and rock stones from the river. Besides, there is a loss of animal population. The number of animal population is decreasing due to lack of grazing lands. This has affected the agricultural production. Now farmers use chemical fertilizer extensively which has deteriorated the quality of soil as people do not know how much chemical fertilizer the soil actually needs.

Group Discussion 7

Piple VDC – 4

Another group has also more or less the same opinion with regard to the national park and rhino conservation. But with regard to benefit sharing, many participants looked unhappy with the buffer zone policy. They said that those who are not members of users' group committees, they are not paid any compensation. The group meeting is held every week and poor people cannot attend weekly meeting as they need to go to work. People also do not know about the usefulness of users, group committee. They are not aware of it. They also cannot return money if they borrow money from the committee and in the event that they fail to return their loan on due time, the committee confiscate their cooking pots or small animals. This insults them very much. So they keep themselves a bit far away from the community organization. There is also no difference between the park rule and buffer zone rule. They have a tripartite agreement among the park warden, user group's chair and forest committee chair. The same park rule is applied to use the forest products from the community forests.

All of the villagers depend upon agriculture. So they need to be compensated properly if their crops are damaged and animals are killed by rhinos or other wild predators. But the compensation made by the wild animals is not enough. Also the committee members are not fair to all. Compensation is made arbitrarily. So some get good compensation and others do not. Park control should be minimized and the local committee should be entrusted fully with the management responsibilities of the buffer zone areas. Employment opportunities should be made available. Park does not give priority for the education. Budget should be allocated on the priority basis.

The local people are very careful about the legal punishment of rhino poaching. So they keep themselves far away from illegal poaching. But the park authority is not working honestly and effectively. The ordinary villager does not get pardoned even if he goes to the nearby forest of the Park for urinating and defecating. He gets arrested and beaten severely. It happened last year in the village. It was a very sad story. But they do not arrest rich and politically powerful people. For example, two years ago, the village peoples caught a poacher in Piple VDC, but the army came and released him without any punishment. The Chairman of the Hetauda District Development Committee Mr. Deepak Singh is another example. Every villager knows that he is a poacher, but he never gets arrested. If he gets arrested, he is released soon because he has good connection with politically powerful people.

There is no incident of rhino poaching for the last 14 years. The villagers are watching this very carefully. They are very supportive to rhino conservation if the park people

work honestly and effectively even though the tourism has not yet benefited the village people. An increase in the number of rhino essentially increases the aesthetic value of their village.

The villagers should be provided with an alternative agricultural crop which rhino does not like to eat. Like in Manag district of Nepal, the park affected people of National park should be provided with the special privileges of custom-free import and export business. Or employment should be provided to village people according to their qualifications and work experiences.

Group discussion 8

Patihani VDC -1, Ghatgai (Bote Tole)

This village consists of 25 Bote and 7 Tharu households. Botes live outside the skirt of Tharu settlements. They do not have any lands. Their huts are erected on the public lands (*ailani*) at the bank of Rapti River. Their main occupation was fishing and boating. But these days they no longer follow their traditional occupations due to conservation policy of the national park. So, they work as daily wage labourers and maintain their economic life. Many young people from this village have migrated to India to work. With regard to their economic life, my 73 year old Bote informant told that

*Bote ko khetipati chhaina simaliko dunga,
macchamare khayao bhat natra masaryo junga*

This means that Bote do not have agriculture. Their main property is the wooden boat of *simal* tree, which they use for sailing. They eat food if they catch fishes, if not they stay hungry playing with their mustache. But these days, they cannot go for fishing. The same informant told me that the national park does not allow to them to move around. This is the pain for them. They have no lands and animals for agricultural production. They have no effect of buffer zone and no effect of tourism. They have no lands, so rhinos do not make any damages to their crops. But they destroy their huts from time to time. One old woman showed me her hut fully destroyed by rhino.

At the same time, Tharu peoples reported that rhino damage most of their crops each year. They have stopped cultivating wheat because of damage made by rhino. They said that small farmers like Tharus are the victims of the national park. There is no employment opportunity in the village. There is only one safari hotel in their village and this does not generate any employment opportunities for them. At present, this hotel itself is in the critical situation, because a few tourists spend nights in this hotel. The villagers also have the problem of the soil cutting by the Rapti River. Each year, the Rapti River is cutting the edges of their village. The buffer zone committee promised to make embankment to protect their village, but the committee did not keep their words.

Group Discussion 9

Ratna Nagar Municipality – 5, Bagmara

This village is predominantly a Tharu society. There are more than 50 households of Tharu communities in one cluster. All Tharus are agricultural farmers and most of them hold agricultural lands in a variable quantity. This village is very close to Sauraha and the Tharu people have been benefiting from the park in terms of job opportunities, small

hotel/pub business and cultural clubs. They said that rhinos make a lot of harm to them in many ways (such as crop damage, physical attack, destruction of fences and *machan* etc), yet they get benefits from the park. For the last three years, they have been receiving funds for their community development, which they have used for fencing their community forest and constructing bridges and embankment wall in the rivers. They get training for knitting, weaving and producing off-season vegetables. They can also collect straw (*kharkahdai* and *babiyo*) from the park for three days and fuel woods and fodder grass from the buffer zone. The most affected villages, according to them, are Kumroj, Bachauli, Ratnanagar and Pipliya. Each year, villagers in these villages lose many things due to the national park. So the government should pay special attention to these affected villages.

ANNEX B Interviews with convicted poachers

A. Bhanu Ram (Bhajana) Darai

Bharatpur Municipality – 8, Salyani

1st January 2004

I met Bhanu Ram Darai (60) in the district jail of Hetauda in the year of 2000 when I was conducting a research project on an assessment on Anti poaching Operation Program. In 1998, he had been arrested on the charge of his involvement of rhino poaching case. Being proved as innocent, he was released after three years in 2001. Now he lives with his married son. He does not work at the field, as he does not own any lands for cultivation. During summer, he makes fishing nets and put traps to catch fishes in the seasonal rivers next to his house. Before the construction of fences, rhinos used to come and damage crops in the fields of villagers. After the construction of fences, rhinos do not come and they cannot damage crops. At present, his main concern is to regain his social stigma once he lost due to his arrest on rhino poaching case.

Tula Ram (40) comes from the Tharu community of Laugain village of Pithauli VDC – 8. He lives with his wife and a young son. He owns 14 Kaththa of lands. His wife works in the farm and produces enough foods to support his family. He was arrested in 1996 for an accusation of his involvement in rhino poaching and was sentenced to jail for two years and fined RS. 20,000. In 2001, he was arrested again on the same charge and he was released later in 2003 on the occasion of constitution day of Nepal.

B. Tula Ram Gurau

Pithauli VDC – 8

2nd January 2004

Tula Ram told me that one evening he met his uncle coming from Kathmandu. He was drunk and he had a lot of money in his bag. He followed his uncle to his home. Tularam surprised with his uncle's extraordinary life style. Neither had his uncle started any other business nor had he sold any piece of his land, yet he had a television at his home and he was holding that big amount of money. Out of his curiosity, Tula Ram asked about his uncle about his business. His uncle did not disclose his income source. In stead he threatened Tula Ram for not to care of his personal business. Before leaving his uncle's

house, Tualram warned his uncle pretending as if he knew his involvement in rhino poaching. Next morning Tula Ram's uncle came to his own house and bribed Tula Ram with RS. 10,000. Since Tula Ram had a habit of drinking liquor and his income was not enough for this purpose, he accepted money from his uncle and he promised for not to report to anybody about his uncle's illegal business. Later his uncle caught arrested by the park peoples with his gun and tow-chain. Tula Ram also got arrested on May 1994 at his uncle's report. As said earlier, Tula Ram was sentenced to jail for two years and fined RS. 20,000. He was released after two years on May 1996 from Bharatpur jail of Chitwan district. But the Appellate court re-appealed his case and he was rearrested again on Feb 2001 and released on Nov. 2003 without any fine.

At present Tula Ram is at his home. He has started his own business of buying and selling local raw materials. He knew that the rhino poaching is illegal and it is a very risky game. It puts his life at risk. He knew severe punishment of rhino poaching. But he was forced to get involved in such an illegal business as he was hungry for money by that time. Now he realized his mistakes and he promised for not to repeat the same thing again. He says that society looks down him and even his family due to his illegal act. He lost his credibility in his society. At present, he is trying to recover his social prestige by doing good works for the local communities. He says park and community forest have benefited his family, because they get fodder and fuel woods and thatching straw. In fact buying thatching straw from the local communities and selling them to paper factory and hotel owners is among his other current businesses. He says government should take care of the poor people by providing appropriate compensation of the crop damage made by rhinos and other wild animals and creating job opportunities for young people so that many other young people like him would not get involved in such illegal business.

C. Case Studies of Poachers in Chitwan District Jail, Bharatpur

11th January 2004

Case 1: Bam Bahadur Praja (27)

Bam Bahadur Praja comes from the Siddi VDC – 3 of Chitwan district. For the last five months, he is in the jail for his rhino poaching case. The park has accused him for killing 17 rhinos within a year. But he denied it and said that no body would believe that he killed 17 rhinos in a year. Killing rhinos is not that easy. There are so many difficulties that the poachers face. But he confessed that he had killed 3 rhinos two years ago with his muzzle loaded gun in the community forest of Daldale. One notoriously reputed smuggler bribed him with RS. 25,000 and asked him to kill three rhinos. He said that with the exception of money he did not think about anything. He knows about the legal punishment for rhino poaching, but he saw money in front of him. He is poor and he has old parents, wife and two young children at home to support by himself. Besides a small quantity of poor quality land for agriculture, he does not any other sources of income to support his family economy, he could not avoid offer made by the smuggler. Now he realized his mistake and he is prepared to any types of punishment according to the law of the nation.

Case 2: Yam Lal Gurau (45)

Yam Lal Gurau comes from Pithauli VDC – 8 of Nawalparasi district. He is in Bharatpur jail for the last three years. He was arrested in 1996 and sentenced to jail for five years on the charge of poaching rhino. He confessed that he had helped poacher to kill one rhino and receive Rs. 33,000 from the poacher for his help. In addition to his five year jail sentence, he also paid RS. 50,000 as a fine to the government. Three years ago, he found a dead rhino in the community forest and reported to the park guard post. The dead rhino was with its horn and the park people took it. But they arrested him because they still had doubt about his activities.

Case 3: Laba Malla (48)

Laba Malla comes from Bhratpur Municipality- 9 of Chitwan district. He is in the Bharatpur jail for the last 9 month. He was arrested for his involvement in trading rhino horn. He confessed his crime. He had received RS. 24,000 from a business man from Manag. He spent the money for household expenses. He told that his family expenses are increasing daily due to inflation. But he has no source of income to support his old mother, wife and five children at home. His 14 kattha of land does not produce everything they need. He should buy many things from the market. So he was easily bribed from a smuggler. He belongs to a Thakuri family, so he is now very concerned about his social prestige.

Case 4: Nar Bahadur Bishwokarma (27)

Nar Bahadur Bishwokarma comes from Pithauli VDC of Nawalparasi district. He is in Bharatpur jail for the last one year. Before his arrest, he was working as a forest guard of the community forest in his own village. Last year, he got arrested due his friend who is in jail together with him. He did swear that he had never involved himself in rhino poaching and its illegal trading. He admitted that he used to eat rhino meat whenever he used to get it. Park people knew about it. He ate rhino meat, because it was free. After his friend's report, the park people arrested him on doubt. Now he loses his job and his social prestige. He is the only bread winner in his family of 5. He is worried about his family. He told that the rich people get released even if they kill rhino, but poor people like him bear the cost of that.

Case 5: Chandra Bahadur Praja (21)

Chandra Bahadur Praja originally comes from old Padampur VDC and presently resides in newly settlement village called Sagun Tole with his mother and a brother. He is in the jail for the last 8 months on the charge of killing a rhinos. He admitted that 2 years ago he killed a one rhino when he used to work for park and look after elephants. He knew about how to and where to kill rhino. One smuggler approached him and gave him RS.10,000 to kill a rhino. He accepted the money from the smuggler, because for him it was a big amount, which he had never seen in his life. So he trapped one rhino into a pit. For this crime, he already spent 2 and half year sentence to jail. Now he again got arrested in doubt. He said that at this time he got arrested without any evidence. Neither he has killed any rhino nor has he got involved in any rhino part trading business. His friends who got arrested on the same charge before his arrest reported him about the rhino poaching. This is the only evidence. He does not know any legal procedures and he does not have money for legal aid. He is helpless. He is worried about his future and

pleads for a pardon so that he can have a chance to correct his mistake and improve his future career.

ANNEX C Interviews with hotel and lodge owners and government and non-governmental officials

Interview 1

Dr. Krishna Oli, National Program Manager, KMNTC

Uddhav Dhungana, RCNP Ranger

7th January 2004

According to park office personnel, one-horn rhinos are unique species in the world. They are found only in Nepal and India. So one-horn rhinos get utmost priority in their conservation program. They said that rhinos are national property. They attract tourists and tourists are sources of foreign exchange for the country. They know that the rhinos have caused great damages to the local farmers, but local farmers have also benefited from them in many ways. After the establishment of buffer zone, the government has already invested 11 million rupees for the community development in the park areas. Despite this heavy investment, the government has not been able to reduce the population pressure in the park.

Interview 2

Hotel and Lodge Owners, Sauraha,

8th January 2004

For the hotel and lodge owners, rhinos are the only sources of income. Rhinos have attracted tourists and many other peoples from around the world. The hotel and lodge business goes down when tourists do not come there and without rhino tourists would not come there. For the last several years, hotel and lodge business is going on well due to security reason. As a result, the number of tourists has gone down drastically. This has put hotel and lodge owners in deficit. Yet hotel and lodge owners are still employing some staff to maintain their hotels and lodges. Several hotels keep elephants for their foreign customers. Elephant is very expensive animals. If the present situation continues for another several years in Nepal, there will be no hotel and lodge in Sauraha. So they wish for peace in the country.

Interview 3

Rameshwar Prasad Chautariya

Padampur – 3, Saguntole

9th January, 2004

Mr. Rameshwar Chautariya moved to Saguntole, a new settlement area for evicted people from Pdaampur VDC in 1998 after the national park annexed his lands into the national park territory under land acquisition policy of the national park. He not only lost his traditional rights over his lands and forest resources, he also lost his spiritual relations with them. The government compensated only one third of his land property. Originally, he

owned 5 bighas of land at his home village. Now he owns only 2 bighas of land in his new settlement area. He complains that compared to the former lands, the quality of land in his new settlement area is very poor. As a result the agricultural production is not enough to support his family. He also cannot grow rice in his new fields. The translocation committee of Padampur promised many other social welfare programs without successful implementation. Although the damage by rhinos in his new fields is not a matter of his family worry, but they have other problems of adjustment. This is even a serious problem for others who did not have enough lands in their original village and thereby did not get enough land in Saguntole. There is also no job opportunity in the village. As a result, many of their young people have living a reckless life hanging around the village and destroying their future.